

# ASTRONOMY AND ASTROPHYSICS

A European Journal

Volume 275 1993

Published by Springer International on behalf of the Board of Directors

# Astronomy and Astrophysics

A European Journal

## Board of Directors

### Chairman:

A. Maeder (Switzerland)

### Vice Chairman:

A. G. Hearn (The Netherlands)

D. Alloin (France)

P. Harmanec (Czech Republic)

P. E. Nissen (Denmark)

B. Szeidl (Hungary)

R. Canal (Spain)

H. Haupt (Austria)

C. Perola (Italy)

R. Wielen (Germany)

G. Contopoulos (Greece)

L. Kresák (Slovak Republic)

Aa. Sandqvist (Sweden)

M. Crézé (France)

K. Mattila (Finland)

J. I. Smak (Poland)

R. Giacconi (ESO)

P. G. Mezger (Germany)

P. Smeyers (Belgium)

## Editors-in-Chief

J. Lequeux

Astronomy and Astrophysics

Editorial Office

Observatoire de Meudon

92195 Meudon Principal Cedex

France

Tel. (33-1) 45-07-06-30

Telex (42) 63 41 03 obsastr

Telefax (33-1) 46 26 62 93

e-mail:

Internet aanda@mesiob.obspm.circe.fr

SPAN MESIOA::AANDA

M. Grewing

Astronomy and Astrophysics

Editorial Office

c/o Astronomisches Institut

Waldhäuserstrasse 64

72076 Tübingen

Germany

Tel. (49-70 71) 29 49 82

Telefax (49-70 71) 29 34 58

Telex (41) 7 262 714 ait d

e-mail:

Internet aaptue@ait.physik.

uni-tuebingen.de

SPAN AITMVX::AAPTUE

## Letter Editor

S. R. Pottasch

Kapteyn Astronomical Institute

P. O. Box 800

9700 AV Groningen

The Netherlands

Tel. (31-50) 63 40 93

Telex (44) 53 572 stars nl

Telefax (31-50) 63 61 00

## Editorial secretaries

Miss B. Perche

Mrs. M. Rougeot

Mr. W. M. Wettlaufer

Mrs. J. Zwegers-Morris

The exclusive copyright © for all languages and countries, including the right for photomechanical and any other reproduction, also in microform, is vested in European Southern Observatory (ESO).

The use of registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Springer International 1993

Printed in Germany

Printer: Saladruck Steinkopf & Sohn, Berlin

Bookbinder: Lüderitz & Bauer, Berlin

# Contents

## Letters to the Editor

The soft  $\gamma$ -ray source 1E 1740.7-2942 revisited: SIGMA observation of a new transient activity beyond 200 keV

Cordier, B., Paul, J., Ballet, J., Goldwurm, A.,  
Bouchet, L., Roques, J.P., Mandrou, P., Vedrenne, G.,  
Churazov, E., Gilfanov, M., Sunyaev, R., Novikov, B.,  
Chulkov, I., Kuleshova, N., Tserenin, I., Sheikhet, A. L1

TOPbase at the CDS

Cunto, W., Mendoza, C., Ochsenbein, F., Zeppen, C.J. L5

An unusual case of HCN hyperfine anomalies in S 76E

Zinchenko, I., Forsström, V., Mattila, K. L9

Detectability of chromospheric evaporation fronts in solar flares

Peres, G., Reale, F. L13

Extreme ultra violet plasma diagnostic: a test using EUVE calibration data

Landini, M., Monsignori Fossi, B.C. L17

A strong dependence of the narrow CIV absorption line density on the quasar emission redshift

Borgeest, U., Mehlert, D. L21

A measurement of the  $l=1$  solar rotational splitting

Loudagh, S., Provost, J., Berthomieu, G.,  
Ehgamerdiev, S., Fossat, E., Gelly, B., Grec, G.,  
Khalikov, S., Lazrek, M., Palle, P., Regulo, C.,  
Sanchez, L., Schmider, F.-X. L25

SN 1993J: explosion of a massive cool supergiant with a small envelope mass?

Höflich, P., Langer, N., Duschinger, M. L29

## Cosmology

A deep X-ray survey in the Lockman Hole and the soft X-ray log  $N$ -log  $S$

Hasinger, G., Burg, R., Giacconi, R., Hartner, G.,  
Schmidt, M., Trümper, J., Zamorani, G. 1

(RN) Large-scale inhomogeneities and galaxy number counts

Phillipps, S. 357

## Extragalactic astronomy

The stellar kinematics of galactic disks

Bottema, R. 16

(RN) On the Maxwellian alternative to the galactic dark matter problem

Sivaram, C. 37

Photometric distances to five dwarf galaxies in the vicinity of M 81

Tikhonov, N.A., Karachentsev, I.D. 39

(RN) The optical and radio spectrum of the radio-selected high redshift quasar S4 1745+624

Stickel, M. 49

X-ray and gamma-ray emission from active galactic nuclei

Cheng, K.S., Yu, K.N., Ding, K.Y. 53

On the intrinsic shape of elliptical galaxies

Tenjes, P., Busarello, G., Longo, G., Zaggia, S. 61

Detection statistics of Abell and ACO clusters of galaxies in the ROSAT All-Sky Survey

Ebeling, H., Voges, W., Böhringer, H., Edge, A.C. 360

First 43 GHz VLBI-observations with the 30-m radio telescope at Pico Veleta

Krichbaum, T.P., Witzel, A., Graham, D.A.,  
Standke, K.J., Schwartz, R., Lochner, O.,  
Schalinski, C.J., Greve, A., Steppe, H., Brunswig, W.,  
Butin, G., Hein, H., Navarro, S., Peñalver, J.,  
Grewing, M., Booth, R.S., Colomer, F., Rönnäng, B.O. 375

Effects of interactions on the nuclear near-infrared properties of spiral galaxies

Giuricin, G., Biviano, A., Girardi, M., Mardirossian, F.,  
Mezzetti, M. 390

High-frequency variability of extragalactic radio sources. II. A statistical multi-frequency model of variability

Magdziarz, P., Machalski, J. 405

Star formation in galactic nuclei

Krügel, E., Tutukov, A.V. 416

Particle acceleration by multiple shocks at the hot spots of extragalactic radio sources

Anastasiadis, A., Vlahos, L. 427

Statistical properties of stellar populations and surface-brightness fluctuations in galaxies

Buzzoni, A. 433

The merging Seyfert galaxies Mkn 423 and Mkn 739

Rafanelli, P., Marziani, P., Birkle, K., Thiele, U. 451

## Galactic structure and dynamics

The velocity field of the outer Galaxy

Brand, J., Blitz, L. 67

Liouville's equation. V. The full symmetries of  $r^{-1}$ -potentials

Dehghani, M.H., Sobouti, Y. 91

## IV

On the Li production by galactic C stars <i>Abia, C., Isern, J., Canal, R.</i>	96	The double-mode semiregular variable UU Herculis: 1990–1992 photometry <i>Zsoldos, E., Fernie, J.D., Arellano Ferro, A., Seager, S.</i>	484
The chemical evolution of the galactic disk. I. Analysis and results <i>Edvardsson, B., Andersen, J., Gustafsson, B., Lambert, D.L., Nissen, P.E., Tomkin, J.</i>	101	Star formation in the Vela molecular clouds. II. The luminosity function of the Class I sources <i>Lorenzetti, D., Spinoglio, L., Liseau, R.</i>	489
Molecular clouds close to the Galactic Center <i>Biermann, P.L., Duschl, W.J., von Linden, S.</i>	153	Search for hydroxyl in southern cold IRAS sources <i>Silva, A.M., Azcárate, I.N., Pöppel, W.G.L., Likkell, L.</i>	510
(RN) On the age and chemical discreteness of Strömgren's intermediate population II <i>Knude, J.</i>	463	<b>Stellar atmospheres</b>	
The solar motion. III. From space velocities <i>Jaschek, C., Valbousquet, A.</i>	472	Multi-site continuous spectroscopy. I. Overview of the MUSICOS 1989 campaign organization <i>Catala, C., Foing, B.H., Baudrand, J., Cao, H., Char, S., Chatzichristou, H., Cuby, J.G., Czarny, J., Dreux, M., Felenbok, P., Floquet, M., Guérin, J., Huang, L., Hubert-Delplace, A.M., Hubert, H., Huovelin, J., Jankov, S., Jiang, S., Li, Q., Neff, J.E., Petrov, P., Savanov, I., Shcherbakov, A., Simon, T., Tuominen, I., Zhai, D.</i>	245
<b>Stellar clusters and associations</b>		Very small dust grains in the circumstellar environment of Herbig Ae/Be stars <i>Natta, A., Prusti, T., Krügel, E.</i>	527
(RN) The Hyades distance and white dwarf constraints <i>Weidemann, V.</i>	158	<b>Diffuse matter in space (including H II regions and planetary nebulae)</b>	
Spectroscopic identification of white dwarfs in galactic clusters. VI. Three new white dwarfs in NGC 3532 <i>Koester, D., Reimers, D.</i>	479	Imaging and spectroscopy of Abell 63 (UU Sge) <i>Walton, N.A., Walsh, J.R., Pottasch, S.R.</i>	256
<b>Formation, structure and evolution of stars</b>		N 63A: a supernova remnant within an H II region <i>Dickel, J.R., Milne, D.K., Junkes, N., Klein, U.</i>	265
(RN) Planetary system around the pulsar PSR 1257+12 <i>Bisnovatyi-Kogan, G.S.</i>	161	The bright end of the planetary nebula luminosity function <i>Méndez, R.H., Kudritzki, R.P., Ciardullo, R., Jacoby, G.H.</i>	534
Probing the AGB tip: luminous carbon stars in the galactic plane <i>Kastner, J.H., Forveille, T., Zuckerman, B., Omont, A.</i>	163	Tracing the roots of interstellar mid-infrared emission <i>Jenniskens, P., Désert, F.-X.</i>	549
On the ephemeris of the cataclysmic variable V 2051 Ophiuchi: evidence of orbital period cyclic changes <i>Echevarria, J., Alvarez, M.</i>	187	A search for molecular oxygen in cold dark clouds <i>Fuente, A., Cernicharo, J., García-Burillo, S., Tejero, J.</i>	558
A possible explanation of the origin of the second kind of magnetic fields of neutron stars <i>Luo, L.-F., Yang, G.-C., Lu, T.</i>	192	Low-mass protostellar condensations in magnetized molecular clouds <i>Porro, I., Silvestro, G.</i>	563
A second phase of star formation in the Serpens core <i>Casali, M.M., Eiroa, C., Duncan, W.D.</i>	195	The molecular cloud associated with the H II region RCW 34 <i>Pagani, L., Heydari-Malayeri, M., Castets, A.</i>	573
Strömgren photometry of dwarf novae <i>Echevarria, J., Costero, R., Michel, R.</i>	201	(RN) Numerically efficient expressions for nebular line cooling <i>Balick, B., Mellema, G., Frank, A.</i>	588
(RN) Implications of the crustal moment of inertia for neutron-star equations of state <i>Datta, B., Alpar, M.A.</i>	210	(RN) Additional constraints on the Spitzer interstellar depletion model <i>Joseph, C.L.</i>	597
On the difficulty of determining the color-term in the Cepheid PLC relation <i>Fouqué, P., Gieren, W.P.</i>	213	<b>The Sun</b>	
Clues to the structure of the boundary layer in cataclysmic variables from observations of the flickering <i>Bruch, A., Duschl, W.J.</i>	219	The 777 nm oxygen triplet in the Sun and solar-type stars, and its use for abundance analysis <i>Kiselman, D.</i>	269
The X-ray time variability and spectrum of $\gamma$ Cassiopeiae (X 0053+604) <i>Parmar, A.N., Israel, G.L., Stella, L., White, N.E.</i>	227		
Accretion disks around T Tauri stars. IV. The disk–star boundary layer <i>Bertout, C., Bouvier, J., Duschl, W.J., Tscharnuter, W.M.</i>	236		
Study of nova shells. I. V 1229 Aquilae (1970): nebular expansion parallax and luminosity <i>Della Valle, M., Duerbeck, H.W.</i>	239		

- Uncombed fields as the source of the broad-band circular polarization of sunspots  
*Solanki, S.K., Montavon, C.A.P.* 283
- A study of the evolution of electron and ion acceleration during the 09:09 UT solar flare on 1989 September 9  
*Chupp, E.L., Trotter, G., Marschhäuser, H., Pick, M., Soru-Escut, I., Rieger, E., Dunphy, P.P.* 602
- MHD equilibria with flows in uniform gravity. II. A class of exact 2-D loop-like solutions  
*Tsinganos, K., Surlantzis, G., Priest, E.R.* 613
- The solar system**
- The solar F-corona at 2.12  $\mu\text{m}$ : calculations of near-solar dust in comparison to 1991 eclipse observations  
*Mann, I., MacQueen, R.M.* 293
- On the missing interstellar comets  
*Sen, A.K., Rana, N.C.* 298
- Large orbital eccentricities and close encounters at the 2:1 resonance of a dynamical system modelling asteroidal motion  
*Varvoglis, H.* 301
- (RN) On the possibility of a major impact on Uranus in the past century  
*Tyson, N.D., Richmond, M.W., Woodhams, M., Ciotti, L.* 630
- The effect of magnetic fields on the macroscopic instability of the heliopause. I. Parallel interstellar magnetic fields  
*Ruderman, M.S., Fahr, H.J.* 635
- Celestial mechanics and astrometry**
- Accurate procedure for deriving UT1 at a submilliarcsecond accuracy from Greenwich Sidereal Time or from the stellar angle  
*Capitaine, N., Gontier, A.-M.* 645
- Analytical relativistic transformations between reference systems  
*Brumberg, V.A., Bretagnon, P., Francou, G.* 651
- Physical and chemical processes**
- Interaction of charged particles with gravitational waves of various polarizations and directions of propagation  
*Kleidis, K., Varvoglis, H., Papadopoulos, D.* 309
- Constraints on matrices transforming Stokes vectors  
*Nagirner, D.I.* 318
- Compton scattering of polarized light: scattering matrix for isotropic electron gas  
*Nagirner, D.I., Poutanen, J.* 325
- Compton scattering of polarized light in two-phase accretion discs  
*Poutanen, J., Vilhu, O.* 337
- Cosmic rays. III. The cosmic ray spectrum between 1 GeV and  $10^4$  GeV and the radio emission from supernova remnants  
*Biermann, P.L., Strom, R.G.* 659
- Instruments, data processing, and computational methods**
- (RN) *N*-band observations of comet Austin 1989c1: first images with the C10 $\mu$  camera  
*Lagage, P.O., Merlin, P., Remy, S., Sibille, F.* 345
- Digital image centering with the maximum likelihood method  
*Lu Chun-Lin* 349
- Dynamic spectra of radio sources from 4.5 to 5.0 GHz  
*Lecacheux, A., Rosolen, C., Davis, M., Bookbinder, J., Bastian, T.S., Dulk, G.A.* 670
- Holographic measurement on Medicina radio telescope using artificial satellites at 11 GHz  
*Tarchi, D., Comoretto, G.* 679
- Abstracts of articles which have been published in A.&A. Suppl. Ser. 99, No. 2 and 3, and 100, No. 1**
- Orbital elements of 19 double stars (*Text in French*)  
*Baize, P.* 353
- The VLA-WSRT survey of M 33: statistical properties of a sample of optically selected supernova remnants  
*Duric, N., Viallefond, F., Goss, W.M., van der Hulst, J.M.* 353
- A photometric study of interacting galaxies. I. Observations  
*Reshetnikov, V.P., Hagen-Thorn, V.A., Yakovleva, V.A.* 353
- CO and HCN observations of circumstellar envelopes. A catalogue. Mass loss rates and distributions  
*Loup, C., Forveille, T., Omont, A., Paul, J.F.* 354
- H I observations of binary spiral galaxies  
*Oosterloo, T., Shostak, S.* 354
- Polarization in low luminosity radio galaxies  
*Capetti, A., Morganti, R., Parma, P., Fanti, R.* 354
- CCD sequences for the calibration of southern hemisphere survey plates. I  
*Demers, S., Lamontagne, R., Wesemael, F., Fontaine, G., Barnéoud, R., Irwin, M.J.* 355
- CCD sequences for the calibration of southern hemisphere survey plates. II  
*Demers, S., Lamontagne, R., Wesemael, F., Fontaine, G., Barnéoud, R., Irwin, M.J.* 355
- Photoelectric  $\beta$  photometry of 118 stars with  $14 \leq V \leq 15$  and  $B-V \leq 0.650$  at the south galactic pole  
*Knude, J.* 355
- The hydrogen spectrum of model prominences  
*Gouttebroze, P., Heinzel, P., Vial, J.C.* 355
- The Miyun 232 MHz Survey. I. Fields centred at:  $\alpha: 00^{\text{h}}41^{\text{m}}, \delta: 41^{\circ}12'$  and  $\alpha: 07^{\text{h}}00^{\text{m}}, \delta: 35^{\circ}00'$   
*Zhang, X., Zhen, Y., Chen, H., Wang, S.* 356
- Global photometric structure of the Orion nebula  
*Greve, A., van Genderen, A.M., Augasteijn, T.* 356
- Stark broadening of spectral lines of multicharged ions of astrophysical interest. VII. Al III lines  
*Dimitrijević, M.S., Sahal-Bréchet, S.* 356
- UBV photometry of galactic foreground and LMC member stars. I. Galactic foreground stars  
*Gochermann, J., Grothues, H.-G., Oestreich, M.O., Berghöfer, T., Schmidt-Kaler, T.* 356
- MWC 560: spectral atlas for the region 3600 Å–4900 Å  
*Kolev, D., Tomov, T.* 687

<i>UBV</i> photometry of open clusters in the Cassiopeia region.		Some statistical results for extragalactic radio jets	
II. Photoelectric observations of NGC 654		<i>Fan, J.H., Xie, G.Z., Huang, Z.H.</i>	688
<i>Huestamendia, G., del Rio, G., Mermilliod, J.-C.</i>	687	Optical studies of interstellar material in low density regions of the Galaxy. I. A survey of interstellar Na I and Ca II absorption toward 57 distant stars	
Galaxy velocities in eight southern clusters		<i>Sembach, K.R., Danks, A.C., Savage, B.D.</i>	688
<i>Garilli, B., Maccagni, D., Tarengi, M.</i>	687	A catalog of chromospherically active binary stars (second edition)	
General study of group membership. II. Determination of nearby groups		<i>Strassmeier, K.G., Hall, D.S., Fekel, F.C., Scheck, M.</i>	688
<i>Garcia, A.M.</i>	687		
Stark broadening of spectral lines of multicharged ions of astrophysical interest. VIII. VI lines			
<i>Dimitrijević, M.S., Sahal-Bréchet, S.</i>	688		



